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ABSTRACT

This curriculum guide for small engine repair was developed by the state of Mississippi to standardize vocational education course titles and core contents. The objectives contained in this document are common to all small engine repair programs in the state. The guide contains objectives for small engine repair I and II courses. Units in course I cover the following topics: safety and orientation; tools and equipment; fasteners; measuring; engine identification and inspection; basic engine principles and design; principles of operation--four-stroke cycle; principles of operation--two-stroke cycle; lubrication systems; cooling systems; fuel systems; and governor systems. Units in course II cover safety and orientation; basic electricity; ignition systems; charging systems; starting systems; exhaust systems; troubleshooting; overhaul--four-stroke cycle engine; and overhaul--two-stroke cycle engine. Each unit consists of these components: objectives, with core/essential objectives indicated; suggested instructional practices; list of suggested resources; list of evaluation and suggested minimum performance standards, with core/essential objectives indicated; and performance record, with core/essential objectives indicated. A checklist for each course combining all unit performance standards into a single list is included. (KC)

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STANDARDIZED CURRICULUM

FOR

SMALL ENGINE REPAIR

MISSISSIPPI DEPARTMENT OF EDUCATION

OFFICE OF VOCATIONAL, TECHNICAL

AND ADULT EDUCATION

June 1989

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1989

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FOREWORD

This volume is intended to be used in the State of Mississippi as a mechanism for standardizing vocational education course titles and core contents. The need for standardization of curricula was triggered by provisions in the Educational Reform Act of 1982 which mandated:

-- elimination of nearly all currently existing curriculum requirements and development of new curriculum content that is "properly sequenced" and "coordinated";

-- steps to ensure that students master one level of course work before being advanced to the next level and that progression is properly sequenced;

-- a criterion-referenced, state-wide testing program that is built upon an identified set of "basic skills" keyed to student performance in grades 3, 5, 8, and 11;

-- revised graduation requirements that take into account student performance on the basic skills and also on a test of "functional literacy skills"; and

-- a system of accrediting schools that takes into account the performance of districts, schools, and students.

In addition to the mandates of the Educational Reform Act, the Strategic Plan for Vocational and Technical Education in Mississippi also calls for improving the quality of vocational and technical education through the standardization of curricula and the articulation of secondary and postsecondary programs.

Both of these mandates were further reinforced by legislation passed in 1986 which called for the establishment of state-wide "guidelines and procedures for managing an instructional program in the public schools." This legislation calls for instructional management plans containing the following components:

1. a written list of learning objectives for every course for which academic credit is given on students' transcripts (state specified core objectives must be included);

2. suggested instructional practices and resources for the learning objectives;

3. standards for student performance for each learning objective; and

4. systematic procedures for evaluating student performance on the learning objectives.

Specific local district actions regarding the state-wide instructional management plan are also required, namely:

1. The objectives contained in this document are common to all programs in the state. Core objectives are designated with an asterisk. The local district is encouraged to add additional objectives to this listing to meet local needs of students and employers.

2. The local school board must officially adopt the learning objectives as the district's curricula.

3. Pass/fail policies must be based on mastery of learning objectives.

4. Student performance on the learning objectives must be systematically evaluated at least once during the school year.

5. During the school year, records of individual student performance must indicate whether or not the objectives have been mastered. The record must indicate mastery status for each of the objectives tested in the Basic Skills Assessment Program (including functional literacy skills) and must be permanently maintained on all students who do <u>not</u> master the basic and functional literacy skills prior to being tested on them.

6. Each year, information about student performance on learning objectives must be reviewed. Those objectives which students are not mastering must be identified, and a plan must be developed for improving student performance on those objectives.

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SMALL ENGINE REPAIR I

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SMALL ENGINE REPAIR I

Unit No.	Title
1	Safety and Orientation
2	Tools and Equipment
3	Fasteners
4	Measuring
5	Engine Identification and Inspection
6	Basic Engine Principles and Design
7	Principles of Operation - Four-Stroke Cycle
8	Principles of Operation - Two-Stroke Cycle
9	Lubrication Systems
10	Cooling Systems
11	Fuel Systems
12	Governor Systems

COURSE: Small Engine Repair I

Unit 1: Safety and Orientation

Objectives: Upon completion of this unit, the student will:

1. Define new terms associated with safety.
2. Associate the colors of the safety code with their correct application.
*3. List steps for maintaining a safe and orderly shop.
4. Describe the classes of fires.
*5. Distinguish between safe and unsafe shop practices.
*6. List general shop safety rules.
*7. Define terms associated with hazardous materials.
*8. Identify categories of hazardous materials.
*9. State signal words or symbols that indicate how severe a hazard may be.
*10. List methods for reducing hazardous waste.
*11. Identify general procedures for storing hazardous materials and wastes.
*12. Identify and describe the informational sections found on a Material Safety Data Sheet.
*13. Describe general first aid procedures to follow in case of an accident involving hazardous materials.
*14. Identify safety equipment to be used with hazardous materials.
*15. List steps to follow in handling spills and waste disposal.
*16. Identify agencies to be contacted in case of an accident or for more information on hazardous materials.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Warzecha, Mary. Hazardous Materials Fingertip Retrieval System. Alexandria, VA: American Vocational Association. 1988. (Objectives 7-16)

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will define seven terms associated with shop safety.

Objective 2: The student will associate five colors of the safety color code with their correct application.

*Objective 3: The student will list seven steps for maintaining a clean and orderly shop.

Objective 4: The student will describe a characteristic of three classes of fire.

*Objective 5: The student will classify 30 statements concerning shop practices as being safe or unsafe with 100 percent accuracy.

*Objective 6: The student will list three general rules related to shop safety.

*Objective 7: The student will define the following terms associated with hazardous materials: hazardous material, combustible, flammable, corrosive, reactive, E P toxic.

*Objective 8: The student will identify five categories of hazardous materials.

*Objective 9: The student will state in order the five signal words or symbols that indicate how severe a hazard may be.

*Objective 10: The student will list seven methods for reducing hazardous waste.

*Objective 11: The student will identify general procedures for storing hazardous materials and wastes including the following: (a) Make sure that all containers are properly labeled at all times, (b) Mark all containers containing hazardous waste materials with the words "HAZARDOUS WASTE" and with the date that the container was first used to store the waste, (c) Store wastes and materials as described by the manufacturer, (d) Make sure that containers are intact and secure at all times, and (e) Keep all containers closed securely except when being filled or emptied.

*Objective 12: The student will identify and describe nine sections of information found on a Material Safety Data Sheet which provide guidelines for creating a safe work environment.

*Objective 13: The student will describe the following first aid procedures to be followed in case of an accident involving hazardous materials: (a) Move the victim to fresh air, (b) Check the container label, Material Safety Data Sheet, or other source for first aid procedures and begin first aid at once, (c) Contact the person designated to help with first aid and evacuation procedures, (d) Call an ambulance, (e) Follow instructions from the designated person concerning further first aid and evacuation measures,

(f) Remain with the person until the ambulance arrives, and (g) Attach a Material Safety Data Sheet or other information on the material to the person's clothing prior to transport.

*Objective 14: The student will identify seven different pieces of equipment which can be used to protect the body when working with hazardous materials.

*Objective 15: The student will list seven general steps to follow in handling spills and waste disposal.

*Objective 16: The student will identify three Federal and one State agency which should be contacted in case of an accident or to obtain more information about hazardous materials.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Defined new terms associated with safety.
____ 2. Associated the colors of the safety code with their correct application.
____ *3. Listed steps for maintaining a safe and orderly shop.
____ 4. Described the classes of fires.
____ *5. Distinguished between safe and unsafe shop practices.
____ *6. Listed general shop safety rules.
____ *7. Defined terms associated with hazardous materials.
____ *8. Identified categories of hazardous materials.
____ *9. Stated signal words or symbols that indicate how severe a hazard may be.
____*10. Listed methods for reducing hazardous waste.
____*11. Identified general procedures for storing hazardous materials and wastes.
____*12. Identified and described the informational sections found on a Material Safety Data Sheet.
____*13. Described general first aid procedures to follow in case of an accident involving hazardous materials.
____*14. Identified safety equipment to be used with hazardous materials.
____*15. Listed steps to follow in handling spills and waste disposal.
____*16. Identified agencies to be contacted in case of an accident or for more information on hazardous materials.

*Indicates core/essential objectives

COURSE: Small Engine Repair I

Unit 2: Tools and Equipment

Objectives: Upon completion of this unit, the student will:

*1. Identify basic hand tools needed for maintenance and repair of small engines.
*2. Identify the tools used in overhaul of small engines.
3. Identify the types of torque wrenches.
4. List statements concerning the maintenance procedures of hand tools.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will identify 30 basic hand tools used in small engine repair and maintenance.
*Objective 2: The student will identify 14 tools used in the overhaul of small engines.
Objective 3: The student will identify two different types of torque wrenches.
Objective 4: The student will list six statements concerning the maintenance of hand tools.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ *1. Identified basic hand tools needed for maintenance and repair of small engines.
____ *2. Identified the tools used in overhaul of small engines.
____ 3. Identified the types of torque wrenches.
____ 4. Listed statements concerning the maintenance procedures of hand tools.

*Indicates core/essential objectives

COURSE: Small Engine Repair I

Unit 3: Fasteners

Objectives: Upon completion of this unit, the student will:

1. Identify common fasteners.
2. List methods used to remove seized nuts.
3. Identify tools used to restore internal and external threads.
*4. Restore internal threads using a thread insert kit (Helicoil).

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will identify 18 common fastening devices used on small engines.
Objective 2: The student will list four methods for removing a seized nut.
Objective 3: The student will identify four tools used to restore internal and external threads.
*Objective 4: The student will restore internal threads using a thread insert kit (Helicoil) following manufacturer's procedures.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Identified common fasteners.
____ 2. Listed methods used to remove seized nuts.
____ 3. Identified tools used to restore internal and external threads.
____ *4. Restored internal threads using a thread insert kit (Helicoil).

*Indicates core/essential objectives

COURSE: Small Engine Repair I

Unit 4: Measuring

Objectives: Upon completion of this unit, the student will:

*1. Identify measuring instruments used in small engine repair.
*2. Use a plain micrometer.
*3. Use a vernier caliper.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will identify the following measuring instruments: inside micrometer and outside micrometer.
*Objective 2: The student will use a plain micrometer to measure a given object to within +/- .001 inch.
*Objective 3: The student will use a vernier caliper to measure a given object to within +/- .001 inch.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ *1. Identified measuring instruments used in small engine repair.
____ *2. Used a plain micrometer.
____ *3. Used a vernier caliper.

*Indicates core/essential objectives

COURSE: Small Engine Repair I

Unit 5: Engine Identification and Inspection

Objectives: Upon completion of this unit, the student will:

*1. Define new terms associated with engine identification and inspection.
*2. List distinguishing characteristics of four-stroke and two-stroke cycle engines.
3. List categories of information which can be determined from the operator's instructions and/or inspection of the engine.
4. Complete an engine identification and inspection form.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will define five terms associated with engine identification and inspection.
*Objective 2: The student will list three distinguishing characteristics of four-stroke and two-stroke cycle engines.
Objective 3: The student will list four categories of information which can be determined from an operator's manual and/or an inspection of an engine.
Objective 4: The student will complete an engine identification and inspection form provided by the instructor on an assigned engine.

*Indicates core/essential objectives

Performance Record: Place a check by each objective that the student achieved:

____ *1. Defined new terms associated with engine identification and inspection.

____ *2. Listed distinguishing characteristics of four-stroke and two-stroke cycle engines.

____ 3. Listed categories of information which can be determined from the operator's instructions and/or inspection of the engine.

____ 4. Completed an engine identification and inspection form.

*Indicates core/essential objectives

COURSE: Small Engine Repair I

Unit 6: Basic Engine Principles and Design

Objectives: Upon completion of this unit, the student will:

1. Define new terms associated with basic engine principles and design.
*2. Describe the parts of a basic internal combustion engine cylinder unit.
3. List steps in the process by which an internal combustion engine converts chemical energy into rotary motion.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will define fifteen terms associated with basic engine principles and design.
*Objective 2: The student will describe five parts of a basic internal combustion engine cylinder unit.
Objective 3: The student will list five steps in their proper order in the process by which an internal combustion engine converts chemical energy into rotary motion.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Defined new terms associated with basic engine principles and design.
____ *2. Described the parts of a basic internal combustion engine cylinder unit.
____ 3. Listed steps in the process by which an internal combustion engine converts chemical energy into rotary motion.

*Indicates core/essential objectives

COURSE: Small Engine Repair I

Unit 7: Principles of Operation - Four-Stroke Cycle

Objectives: Upon completion of this unit, the student will:

1. Define terms associated with the principles of operation of a four-stroke cycle engine.
*2. Identify basic components of a four-stroke cycle engine.
*3. Describe the operation of a four-stroke cycle engine as related to each stroke of the cycle.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will define ten terms associated with the principles of operation of a four-stroke cycle engine.
*Objective 2: The student will identify seven basic components of a four-stroke cycle engine.
*Objective 3: The student will describe the operation of a four-stroke cycle engine as related to each stroke of the cycle. (1 descriptive factor per stroke)

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Defined terms associated with the principles of operation of a four-stroke cycle engine.
____ *2. Identified basic components of a four-stroke cycle engine.
____ *3. Described the operation of a four-stroke cycle engine as related to each stroke of the cycle.

*Indicates core/essential objectives

COURSE: Small Engine Repair I

Unit 8: Principles of Operation - Two-Stroke Cycle

Objectives: Upon completion of this unit, the student will:

1. Define terms associated with the two-stroke cycle engine.
*2. Identify basic components of a two-stroke cycle engine.
*3. Describe the steps in the operation of a two-stroke cycle.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will define five terms associated with the two-stroke cycle engine.
*Objective 2: The student will identify six basic components of a two-stroke cycle engine.
*Objective 3: The student will describe five steps in the operation of a two-stroke cycle.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Defined terms associated with the two-stroke cycle engine.
____ *2. Identified basic components of a two-stroke cycle engine.
____ *3. Described the steps in the operation of a two-stroke cycle.

*Indicates core/essential objectives

COURSE: Small Engine Repair I

Unit 9: Lubrication Systems

Objectives: Upon completion of this unit, the student will:

1. Define terms related to lubrication systems.
2. List the functions of engine oil.
3. List characteristics of an appropriate engine oil.
4. Describe factors to consider in selection and use of oils for best engine performance.
*5. Change engine oil and filter (if present).
6. Service a crankcase breather.
*7. Mix lubricant and fuel for a two-cycle engine.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985. (Objectives 1-6)

Turner, J. Howard. Care and Operation of Small Gasoline Engines. Athens, GA: American Association for Vocational Instructional Materials. 1986. (Objective 7)

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will define 12 terms related to lubrication systems.
Objective 2: The student will list four functions of engine oil.
Objective 3: The student will list six characteristics of an appropriate engine oil.
Objective 4: The student will describe five factors to consider in selection and use of oils for best engine performance.
*Objective 5: The student will change engine oil and filter (if present) following manufacturer's recommendations.
Objective 6: The student will service a crankcase breather following manufacturer's recommended procedures.

*Objective 7: The student will mix lubricant and fuel for a two-cycle engine to the ratio recommended by the engine manufacturer.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Defined terms related to lubrication systems.
____ 2. Listed the functions of engine oil.
____ 3. Listed characteristics of an appropriate engine oil.
____ 4. Described factors to consider in selection and use of oils for best engine performance.
____ *5. Changed engine oil and filter (if present).
____ 6. Serviced a crankcase breather.
____ *7. Mixed lubricants and fuel for a two-cycle engine.

*Indicates core/essential objectives

COURSE: Small Engine Repair I

Unit 10: Cooling Systems

Objectives: Upon completion of this unit, the student will:

1. Define terms associated with air-cooled cooling systems.
*2. Identify components of an air cooled engine cooling system.
*3. Remove, clean, and replace air cooling system parts.
*4. Identify the parts of a water-cooled engine cooling system.
*5. Inspect and service a water-cooled engine cooling system.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will define five terms associated with air-cooled cooling systems.
*Objective 2: The student will identify five components of an air cooled engine cooling system.
*Objective 3: The student will remove, clean, and replace air cooling system parts following industry accepted procedures.
*Objective 4: The student will identify the following parts of a water-cooled engine cooling system: radiator, upper and lower radiator hose, thermostat housing, thermostat, water pump.
*Objective 5: The student will inspect and service a water-cooled engine cooling system by checking the radiator for leaks, checking the hoses, draining and flushing the system, checking the thermostat, checking the radiator cap, and refilling the system with antifreeze mix.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Defined terms associated with air-cooled cooling systems.
____ *2. Identified components of an air cooled engine cooling system.
____ *3. Removed, cleaned, and replaced air cooling system parts.
____ *4. Identified the parts of a water-cooled engine cooling system.
____ *5. Inspected and serviced a water-cooled engine cooling system.

*Indicates core/essential objectives

COURSE: Small Engine Repair I

Unit 11: Fuel Systems (Carburetor-type)

Objectives: Upon completion of this unit, the student will:

1. List benefits of using unleaded fuel in most new small gas engines.
*2. Identify the components of a typical carburetor-type fuel system
3. Identify the different types of fuel filters.
4. Identify the different types of air cleaners.
*5. Identify the parts of a float-type carburetor.
*6. Identify the parts of a diaphragm-type carburetor.
*7. Service an air cleaner (paper element and polyurethane).
*8. Remove, service, and replace a float-type carburetor.
*9. Remove, service, and replace a diaphragm-type carburetor.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will list two benefits of using unleaded fuel in most new small gas engines.
*Objective 2: The student will identify six components of a typical carburetor-type fuel system.
Objective 3: The student will identify three different types of fuel filters.
Objective 4: The student will identify three different types of air cleaners.
*Objective 5: The student will identify seven parts of a float-type carburetor.
*Objective 6: The student will identify six parts of a diaphragm-type carburetor.
*Objective 7: The student will service an air cleaner (paper element and polyurethane) following industry accepted procedures.

*Objective 8: The student will remove, service, and replace a float-type carburetor following industry accepted procedures.

*Objective 9: The student will remove, service, and replace a diaphragm-type carburetor following industry accepted procedures.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Listed benefits of using unleaded fuel in most new small gas engines.
____ *2. Identified the components of a typical carburetor-type fuel system.
____ 3. Identified the different types of fuel filters.
____ 4. Identified the different types of air cleaners.
____ *5. Identified the parts of a float-type carburetor.
____ *6. Identified the parts of a diaphragm-type carburetor.
____ *7. Serviced an air cleaner (paper element and polyurethane).
____ *8. Removed, serviced, and replaced a float-type carburetor.
____ *9. Removed, serviced, and replaced a diaphragm-type carburetor.

*Indicates core/essential objectives

COURSE: Small Engine Repair I

Unit 12: Governor Systems

Objectives: Upon completion of this unit, the student will:

*1. List purposes of the governor system.
2. Identify components of an air vane governor system and state the purpose of each.
*3. Identify components of a mechanical governor system and state the purpose of each.
*4. Inspect, adjust, and repair an air vane governor.
*5. Inspect, adjust, and repair a mechanical governor with internal flyweights.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will list three purposes of the governor system.
Objective 2: The student will identify four components of an air vane governor system and state one purpose of each component.
*Objective 3: The student will identify five components of a mechanical governor system and state one purpose of each component.
*Objective 4: The student will inspect, adjust, and repair an air vane governor following manufacturer's specifications and procedures.
*Objective 5: The student will inspect, adjust, and repair a mechanical governor with internal flyweights following manufacturer's specifications and procedures.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ *1. Listed purposes of the governor system.
____ 2. Identified components of an air vane governor system and stated the purpose of each.
____ *3. Identified components of a mechanical governor system and stated the purpose of each.
____ *4. Inspected, adjusted, and repaired an air vane governor.
____ *5. Inspected, adjusted, and repaired a mechanical governor with internal flyweights.

*Indicates core/essential objectives

SMALL ENGINE REPAIR II

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SMALL ENGINE REPAIR II

Unit No.	Title
1	Safety and Orientation
2	Basic Electricity
3	Ignition Systems
4	Charging Systems
5	Starting Systems
6	Exhaust Systems
7	Troubleshooting
8	Overhaul Four-Stroke Cycle Engine
9	Overhaul Two-Stroke Cycle Engine

COURSE: Small Engine Repair II

Unit 1: Safety and Orientation (Review and Reinforcement)

Objectives: Upon completion of this unit, the student will:

1. Define new terms associated with safety.
2. Associate the colors of the safety code with their correct application.
*3. List steps for maintaining a safe and orderly shop.
4. Describe the classes of fires.
*5. Distinguish between safe and unsafe shop practices.
*6. List general shop safety rules.
*7. Define terms associated with hazardous materials.
*8. Identify categories of hazardous materials.
*9. State signal words or symbols that indicate how severe a hazard may be.
*10. List methods for reducing hazardous waste.
*11. Identify general procedures for storing hazardous materials and wastes.
*12. Identify and describe the informational sections found on a Material Safety Data Sheet.
*13. Describe general first aid procedures to follow in case of an accident involving hazardous materials.
*14. Identify safety equipment to be used with hazardous materials.
*15. List steps to follow in handling spills and waste disposal.
*16. Identify agencies to be contacted in case of an accident or for more information on hazardous materials.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Warzecha, Mary. Hazardous Materials Fingertip Retrieval System. Alexandria, VA: American Vocational Association. 1988. (Objectives 7-16)

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will define seven terms associated with shop safety.

Objective 2: The student will associate five colors of the safety color code with their correct application.

*Objective 3: The student will list seven steps for maintaining a clean and orderly shop.

Objective 4: The student will describe a characteristic of three classes of fire.

*Objective 5: The student will classify 30 statements concerning shop practices as being safe or unsafe with 100 percent accuracy.

*Objective 6: The student will list three general rules related to shop safety.

*Objective 7: The student will define the following terms associated with hazardous materials: hazardous material, combustible, flammable, corrosive, reactive, E P toxic.

*Objective 8: The student will identify five categories of hazardous materials.

*Objective 9: The student will state in order the five signal words or symbols that indicate how severe a hazard may be.

*Objective 10: The student will list seven methods for reducing hazardous waste.

*Objective 11: The student will identify general procedures for storing hazardous materials and wastes including the following: (a) Make sure that all containers are properly labeled at all times, (b) Mark all containers containing hazardous waste materials with the words "HAZARDOUS WASTE" and with the date that the container was first used to store the waste, (c) Store wastes and materials as described by the manufacturer, (d) Make sure that containers are intact and secure at all times, and (e) Keep all containers closed securely except when being filled or emptied.

*Objective 12: The student will identify and describe nine sections of information found on a Material Safety Data Sheet which provide guidelines for creating a safe work environment.

*Objective 13: The student will describe the following first aid procedures to be followed in case of an accident involving hazardous materials: (a) Move the victim to fresh air, (b) Check the container label, Material Safety Data Sheet, or other source for first aid procedures and begin first aid at once, (c) Contact the person designated to help with first aid and evacuation procedures, (d) Call an ambulance, (e) Follow instructions from the designated person concerning further first aid and evacuation measures,

(f) Remain with the person until the ambulance arrives, and (g) Attach a Material Safety Data Sheet or other information on the material to the person's clothing prior to transport.

*Objective 14: The student will identify seven different pieces of equipment which can be used to protect the body when working with hazardous materials.

*Objective 15: The student will list seven general steps to follow in handling spills and waste disposal.

*Objective 16: The student will identify three Federal and one State agency which should be contacted in case of an accident or to obtain more information about hazardous materials.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Defined new terms associated with safety.
____ 2. Associated the colors of the safety code with their correct application.
____ *3. Listed steps for maintaining a safe and orderly shop.
____ 4. Described the classes of fires.
____ *5. Distinguished between safe and unsafe shop practices.
____ *6. Listed general shop safety rules.
____ *7. Defined terms associated with hazardous materials.
____ *8. Identified categories of hazardous materials.
____ *9. Stated signal words or symbols that indicate how severe a hazard may be.
____*10. Listed methods for reducing hazardous waste.
____*11. Identified general procedures for storing hazardous materials and wastes.
____*12. Identified and described the informational sections found on a Material Safety Data Sheet.
____*13. Described general first aid procedures to follow in case of an accident involving hazardous materials.
____*14. Identified safety equipment to be used with hazardous materials.
____*15. Listed steps to follow in handling spills and waste disposal.
____*16. Identified agencies to be contacted in case of an accident or for more information on hazardous materials.

*Indicates core/essential objectives

COURSE: Small Engine Repair II

Unit 2: Basic Electricity

Objectives: Upon completion of this unit, the student will:

1. Define terms associated with basic electricity.
*2. Name sources of electricity.
3. List examples of conductors and insulators of electricity.
4. Identify common electrical symbols used in schematic diagrams.
*5. List instruments used in checking electrical circuits.
*6. Measure resistance using an ohmmeter.
*7. Check continuity.
*8. Measure amperage in a circuit.
*9. Check voltage.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will define eight terms associated with basic electricity.
*Objective 2: The student will name two sources of electricity.
Objective 3: The student will list three examples of conductors and three examples of insulators of electricity.
Objective 4: The student will identify the following common electrical symbols used in schematic diagrams: battery, ground, solenoid, coil, resistance or load, connection, switch, terminal, fuse.
*Objective 5: The student will list three instruments used in checking electrical circuits.
*Objective 6: The student will measure resistance using an ohmmeter to teacher specifications.
*Objective 7: The student will check continuity of a simple circuit.

*Objective 8: The student will measure amperage in a circuit to within teacher specifications.
*Objective 9: The student will check the voltage of a circuit.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Defined terms associated with basic electricity.
____ *2. Named sources of electricity.
____ 3. Listed examples of conductors and insulators of electricity.
____ 4. Identified common electrical symbols used in schematic diagrams.
____ *5. Listed instruments used in checking electrical circuits.
____ *6. Measured resistance using an ohmmeter.
____ *7. Checked continuity.
____ *8. Measured amperage in a circuit.
____ *9. Checked voltage.

*Indicates core/essential objectives

COURSE: Small Engine Repair II

Unit 3: Ignition Systems

Objectives: Upon completion of this unit, the student will:

*1. Describe the types of ignition systems.
*2. Identify components of a battery ignition system (primary and secondary circuits).
*3. Identify components of a magneto ignition system (primary and secondary systems).
*4. Identify components of a solid state ignition system.
*5. Identify components of a breakerless ignition system.
*6. Describe the purpose of ignition system components.
*7. Describe the operation of battery, magneto, and solid state ignition systems.
*8. Remove, service, and/or replace spark plugs.
*9. Remove and replace contact points and condenser.
*10. Test the coil, condenser, armature, and flywheel magnets.
*11. Test and adjust a solid state ignition system.
*12. Perform a coil power test.
*13. Test condenser for leakage or short.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will describe one characteristic of each of three types of ignition systems.
*Objective 2: The student will identify nine components of a battery ignition system (primary and secondary circuits).
*Objective 3: The student will identify eight components of a magneto ignition system (primary and secondary systems).
*Objective 4: The student will identify five components of a solid state ignition system.

*Objective 5: The student will identify seven components of a breakerless ignition system.
*Objective 6: The student will describe the purpose of nine ignition system components.
*Objective 7: The student will describe the operation of battery, magneto, and solid state ignition systems.
*Objective 8: The student will remove, service, and/or replace spark plugs according to industry accepted practices.
*Objective 9: The student will remove and replace contact points and condenser according to industry accepted practices.
*Objective 10: The student will test the coil, condenser, armature, and flywheel magnets according to industry accepted practices.
*Objective 11: The student will test and adjust a solid state ignition system according to industry accepted practices.
*Objective 12: The student will perform a coil power test according to industry accepted practices.
*Objective 13: The student will test a condenser for leakage or short according to industry accepted practices.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ *1. Described the types of ignition systems.
____ *2. Identified components of a battery ignition system (primary and secondary circuits).
____ *3. Identified components of a magneto ignition system (primary and secondary systems).
____ *4. Identified components of a solid state ignition system.
____ *5. Identified components of a breakerless ignition system.
____ *6. Described the purpose of ignition system components.
____ *7. Described the operation of battery, magneto, and solid state ignition systems.
____ *8. Removed, serviced, and/or replaced spark plugs.
____ *9. Removed and replaced contact points and condenser.
____ *10. Tested the coil, condenser, armature, and flywheel magnets.
____ *11. Tested and adjusted a solid state ignition system.
____ *12. Performed a coil power test.
____ *13. Tested condenser for leakage or short.

*Indicates core/essential objectives

COURSE: Small Engine Repair II

Unit 4: Charging Systems

Objectives: Upon completion of this unit, the student will:

1. Identify components of the charging system and state the function(s) of each.
2. Identify the parts of an alternator charging system.
3. Remove, check, and replace an alternator.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will identify the four basic components of the charging system and state two functions of each component.
Objective 2: The student will identify four parts of an alternator system.
Objective 3: The student will remove, check, and replace an alternator according to industry accepted practices.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Identified components of the charging system and state the function(s) of each.
____ 2. Identified the parts of an alternator charging system.
____ 3. Removed, checked, and replaced an alternator.

*Indicates core/essential objectives

COURSE: Small Engine Repair II

Unit 5: Starting Systems

Objectives: Upon completion of this unit, the student will:

1. Name the types of starting systems.
*2. Identify the components of a mechanical starting system and state the function of each.
3. Identify the components of a DC starting system and state the function of each.
4. Remove, test/service, and replace a DC starter.
*5. Replace a starter rewind spring.
*6. Service the vertical pull starter.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will name three types of starting systems commonly used on small engines.
*Objective 2: The student will identify four components of a mechanical starting system and state one function of each.
Objective 3: The student will identify five components of a DC starting system and state one function of each.
Objective 4: The student will remove, test/service, and replace a DC starter according to industry accepted standards.
*Objective 5: The student will replace a starter rewind spring according to industry accepted standards.
*Objective 6: The student will service the vertical pull starter according to industry accepted standards.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Named the types of starting systems.
____ *2. Identified the components of a mechanical starting system and stated the function of each.
____ 3. Identified the components of a DC starting system and stated the function of each.
____ 4. Removed, tested/serviced, and replaced a DC starter.
____ *5. Replaced a starter rewind spring.
____ *6. Serviced the vertical pull starter.

*Indicates core/essential objectives

COURSE: Small Engine Repair II

Unit 6: Exhaust Systems

Objectives: Upon completion of this unit, the student will:

1. Define terms associated with exhaust systems.
2. State results that can occur from running a damaged or worn exhaust system.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will define five terms associated with exhaust systems.
Objective 2: The student will state two results that can occur from running a damaged or worn exhaust system.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Defined terms associated with exhaust systems.
____ 2. Stated results that can occur from running a damaged or worn exhaust system.

*Indicates core/essential objectives

COURSE: Small Engine Repair II

Unit 7: Troubleshooting

Objectives: Upon completion of this unit, the student will:

*1. List requirements for an engine to run.
*2. List in order the steps in basic troubleshooting procedures.
*3. Troubleshoot the fuel system.
*4. Troubleshoot the ignition system.
*5. Troubleshoot engine compression.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will list three requirements for an engine to run.
*Objective 2: The student will list in order five steps in basic troubleshooting procedures.
*Objective 3: The student will troubleshoot the fuel system according to industry accepted practices.
*Objective 4: The student will troubleshoot the ignition system according to industry accepted practices.
*Objective 5: The student will troubleshoot engine compression according to industry accepted practices.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ *1. Listed requirements for an engine to run.
____ *2. Listed in order the steps in basic troubleshooting procedures.
____ *3. Troubleshot the fuel system.
____ *4. Troubleshot the ignition system.
____ *5. Troubleshot engine compression.

*Indicates core/essential objectives

COURSE: Small Engine Repair II

Unit 8: Overhaul Four-Stroke Cycle Engine

Objectives: Upon completion of this unit, the student will:

1. Define terms associated with engine overhaul.
*2. List causes of engine problems.
*3. Identify parts of a piston and connecting rod assembly.
*4. Identify parts of the crankshaft assembly.
*5. Identify parts of a valve train.
*6. Disassemble a four-stroke cycle engine.
*7. Inspect and overhaul a cylinder.
*8. Inspect and overhaul the piston, rings, and connecting rod.
*9. Inspect and overhaul a valve assembly.
*10. Reassemble a four-stroke cycle engine.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

Objective 1: The student will define 22 terms associated with engine overhaul.
*Objective 2: The student will list four causes of engine problems.
*Objective 3: The student will identify ten parts of a piston and connecting rod assembly.
*Objective 4: The student will identify three parts of the crankshaft assembly.
*Objective 5: The student will identify 11 parts of a valve train.
*Objective 6: The student will disassemble a four-stroke cycle engine following industry accepted procedures.
*Objective 7: The student will inspect and overhaul a cylinder following industry accepted procedures and to manufacturer's specifications.
*Objective 8: The student will inspect and overhaul the piston, rings, and connecting rod following industry accepted procedures and to manufacturer's specifications.

*Objective 9: The student will inspect and overhaul a valve assembly following industry accepted procedures and to manufacturer's specifications.

*Objective 10: The student will reassemble a four-stroke cycle engine to manufacturer's specifications.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ 1. Defined terms associated with engine overhaul.
____ *2. Listed causes of engine problems.
____ *3. Identified parts of a piston and connecting rod assembly.
____ *4. Identified parts of the crankshaft assembly.
____ *5. Identified parts of a valve train.
____ *6. Disassembled a four-stroke cycle engine.
____ *7. Inspected and overhauled a cylinder.
____ *8. Inspected and overhauled the piston, rings, and connecting rod.
____ *9. Inspected and overhauled a valve assembly.
____ *10. Reassembled a four-stroke cycle engine.

*Indicates core/essential objectives

COURSE: Small Engine Repair II

Unit 9: Overhaul Two-Stroke Cycle Engine

Objectives: Upon completion of this unit, the student will:

*1. List causes of two-stroke cycle engine problems.
*2. Identify parts of the piston and connecting rod assembly.
*3. Identify parts of the two-cycle crankshaft assembly.
*4. Disassemble, inspect, and overhaul a two-stroke cycle engine.
*5. Reassemble a two-stroke cycle engine.

*Indicates core/essential objectives

Suggested Instructional Procedures:

Lecture and discussion
Laboratory demonstration and practice

Suggested Resources:

Primary Resource: Hires, Bill; Taylor, Mark; and Bundy, Mike. Small Engine Repair: Two-Stroke and Four-Stroke Cycle. Stillwater, OK: Mid-America Vocational Curriculum Consortium. Revised by Ammon Herd. 1985.

Evaluation and Suggested Minimum Performance Standards:

*Objective 1: The student will list five causes of two-stroke cycle engine problems.
*Objective 2: The student will identify seven parts of the piston and connecting rod assembly.
*Objective 3: The student will identify three parts of the two-cycle crankshaft assembly.
*Objective 4: The student will disassemble, inspect, and overhaul a two-stroke cycle engine following industry accepted procedures and manufacturer's specifications.
*Objective 5: The student will reassemble a two-stroke cycle engine to manufacturer's specifications.

*Indicates core/essential objectives

Performance Record: Place a check by each objective the student achieved:

____ *1. Listed causes of two-stroke cycle engine problems.
____ *2. Identified parts of the piston and connecting rod assembly.
____ *3. Identified parts of the two-cycle crankshaft assembly.
____ *4. Disassembled, inspected, and overhauled a two-stroke cycle engine.
____ *5. Reassembled a two-stroke cycle engine.

*Indicates core/essential objectives

STUDENT PERFORMANCE RECORD

SMALL ENGINE REPAIR

SMALL ENGINE REPAIR I

Student: _____

This record is provided as an alternative to the student performance records at the end of each unit. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the course.

Place a check by each objective the student achieved; you may wish to note the date that the student achieved the objective.

C = Core competencies.

____ 1. Defined new terms associated with safety.
____ 2. Associated the colors of the safety code with their correct application.
____ C3. Listed steps for maintaining a safe and orderly shop.
____ 4. Described the classes of fires.
____ C5. Distinguished between safe and unsafe shop practices.
____ C6. Listed general shop safety rules.
____ C7. Defined terms associated with hazardous materials.
____ C8. Identified categories of hazardous materials.
____ C9. Stated signal words or symbols that indicate how severe a hazard may be.
____C10. Listed methods for reducing hazardous waste.
____C11. Identified general procedures for storing hazardous materials and wastes.
____C12. Identified and described the informational sections found on a Material Safety Data Sheet.
____C13. Described general first aid procedures to follow in case of an accident involving hazardous materials.
____C14. Identified safety equipment to be used with hazardous materials.
____C15. Listed steps to follow in handling spills and waste disposal.
____C16. Identified agencies to be contacted in case of an accident or for more information on hazardous materials.
____C17. Identified basic hand tools needed for maintenance and repair of small engines.
____C18. Identified the tools used in overhaul of small engines.
____ 19. Identified the types of torque wrenches.
____ 20. Listed statements concerning the maintenance procedures of hand tools.
____ 21. Identified common fasteners.
____ 22. Listed methods used to remove seized nuts.
____ 23. Identified tools used to restore internal and external threads.
____C24. Restored internal threads using a thread insert kit (Helicoil).
____C25. Identified measuring instruments used in small engine repair.

____C26. Used a plain micrometer.
____C27. Used a vernier caliper.
____C28. Defined new terms associated with engine identification and inspection.
____C29. Listed distinguishing characteristics of four-stroke and two-stroke cycle engines.
____ 30. Listed categories of information which can be determined from the operator's instructions and/or inspection of the engine.
____ 31. Completed an engine identification and inspection form.
____ 32. Defined new terms associated with basic engine principles and design.
____C33. Described the parts of a basic internal combustion engine cylinder unit.
____ 34. Listed steps in the process by which an internal combustion engine converts chemical energy into rotary motion.
____ 35. Defined terms associated with the principles of operation of a four-stroke cycle engine.
____C36. Identified basic components of a four-stroke cycle engine.
____C37. Described the operation of a four-stroke cycle engine as related to each stroke of the cycle.
____ 38. Defined terms associated with the two-stroke cycle engine.
____C39. Identified basic components of a two-stroke cycle engine.
____C40. Described the steps in the operation of a two-stroke cycle.
____ 41. Defined terms related to lubrication systems.
____ 42. Listed the functions of engine oil.
____ 43. Listed characteristics of an appropriate engine oil.
____ 44. Described factors to consider in selection and use of oils for best engine performance.
____C45. Changed engine oil and filter (if present).
____ 46. Serviced a crankcase breather.
____C47. Mixed lubricants and fuel for a two-cycle engine.
____ 48. Defined terms associated with air-cooled cooling systems.
____C49. Identified components of an air cooled engine cooling system.
____C50. Removed, cleaned, and replaced air cooling system parts.
____C51. Identified the parts of a water-cooled engine cooling system.
____C52. Inspected and serviced a water-cooled engine cooling system.
____ 53. Listed benefits of using unleaded fuel in most new small gas engines.
____C54. Identified the components of a typical carburetor-type fuel system.
____ 55. Identified the different types of fuel filters.
____ 56. Identified the different types of air cleaners.
____C57. Identified the parts of a float-type carburetor.
____C58. Identified the parts of a diaphragm-type carburetor.
____C59. Serviced an air cleaner (paper element and polyurethane).
____C60. Removed, serviced, and replaced a float-type carburetor.
____C61. Removed, serviced, and replaced a diaphragm-type carburetor.

____C62. Listed purposes of the governor system.
____ 63. Identified components of an air vane governor system and stated the purpose of each.
____C64. Identified components of a mechanical governor system and stated the purpose of each.
____C65. Inspected, adjusted, and repaired an air vane governor.
____C66. Inspected, adjusted, and repaired a mechanical governor with internal flyweights.

SMALL ENGINE REPAIR II

Student: _____

This record is provided as an alternative to the student performance records at the end of each unit. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the course.

Place a check by each objective the student achieved; you may wish to note the date that the student achieved the objective.

C = Core competencies.

____ 1. Defined new terms associated with safety.
____ 2. Associated the colors of the safety code with their correct application.
____ C3. Listed steps for maintaining a safe and orderly shop.
____ 4. Described the classes of fires.
____ C5. Distinguished between safe and unsafe shop practices.
____ C6. Listed general shop safety rules.
____ C7. Defined terms associated with hazardous materials.
____ C8. Identified categories of hazardous materials.
____ C9. Stated signal words or symbols that indicate how severe a hazard may be.
____C10. Listed methods for reducing hazardous waste.
____C11. Identified general procedures for storing hazardous materials and wastes.
____C12. Identified and described the informational sections found on a Material Safety Data Sheet.
____C13. Described general first aid procedures to follow in case of an accident involving hazardous materials.
____C14. Identified safety equipment to be used with hazardous materials.
____C15. Listed steps to follow in handling spills and waste disposal.
____C16. Identified agencies to be contacted in case of an accident or for more information on hazardous materials.
____ 17. Defined terms associated with basic electricity.
____C18. Named sources of electricity.
____ 19. Listed examples of conductors and insulators of electricity.
____ 20. Identified common electrical symbols used in schematic diagrams.
____C21. Listed instruments used in checking electrical circuits.
____C22. Measured resistance using an ohmmeter.
____C23. Checked continuity.
____C24. Measured amperage in a circuit.
____C25. Checked voltage.
____C26. Described the types of ignition systems.
____C27. Identified components of a battery ignition system (primary and secondary circuits).

____C28. Identified components of a magneto ignition system (primary and secondary systems).
____C29. Identified components of a solid state ignition system.
____C30. Identified components of a breakerless ignition system.
____C31. Described the purpose of ignition system components.
____C32. Described the operation of battery, magneto, and solid state ignition systems.
____C33. Removed, serviced, and/or replaced spark plugs.
____C34. Removed and replaced contact points and condenser.
____C35. Tested the coil, condenser, armature, and flywheel magnets.
____C36. Tested and adjusted a solid state ignition system.
____C37. Performed a coil power test.
____C38. Tested condenser for leakage or short.
____ 39. Identified components of the charging system and state the function(s) of each.
____ 40. Identified the parts of an alternator charging system.
____ 41. Removed, checked, and replaced an alternator.
____ 42. Named the types of starting systems.
____C43. Identified the components of a mechanical starting system and stated the function of each.
____ 44. Identified the components of a DC starting system and stated the function of each.
____ 45. Removed, tested/serviced, and replaced a DC starter.
____C46. Replaced a starter rewind spring.
____C47. Serviced the vertical pull starter.
____ 48. Defined terms associated with exhaust systems.
____ 49. Stated results that can occur from running a damaged or worn exhaust system.
____C50. Listed requirements for an engine to run.
____C51. Listed in order the steps in basic troubleshooting procedures.
____C52. Troubleshot the fuel system.
____C53. Troubleshot the ignition system.
____C54. Troubleshot engine compression.
____ 55. Defined terms associated with engine overhaul.
____C56. Listed causes of engine problems.
____C57. Identified parts of a piston and connecting rod assembly.
____C58. Identified parts of the crankshaft assembly.
____C59. Identified parts of a valve train.
____C60. Disassembled a four-stroke cycle engine.
____C61. Inspected and overhauled a cylinder.
____C62. Inspected and overhauled the piston, rings, and connecting rod.
____C63. Inspected and overhauled a valve assembly.
____C64. Reassembled a four-stroke cycle engine.
____C65. Listed causes of two-stroke cycle engine problems.
____C66. Identified parts of the piston and connecting rod assembly.
____C67. Identified parts of the two-cycle crankshaft assembly.
____C68. Disassembled, inspected, and overhauled a two-stroke cycle engine.
____C69. Reassembled a two-stroke cycle engine.